

Abstract title: PREDICTORS OF INDOOR ENDOTOXIN CONCENTRATIONS IN DUST AND AIR

Noth, Elizabeth, University of California, Berkeley, USA
Hammond, S. Katharine, University of California, Berkeley, USA
Lurmann, Fred, Sonoma Technology Inc., USA
Tager, Ira B., University of California, Berkeley, USA

Background and Aims: Endotoxin, a component of the outer membrane of gram-negative bacteria, has been found to cause airway inflammation. It has been hypothesized that exposure to endotoxin may have a profound effect on asthma sufferers, but little is known about either the exposure levels or the scale of the impact. One goal of the Fresno Asthmatic Children's Environment Study (FACES), a 10-year epidemiology study to evaluate the role of ambient air pollution and bioaerosols on the natural history of childhood asthma, was to understand and evaluate the exposure to airborne and dust endotoxin. Using data collected in the FACES study, we explore these relationships for use in predicting daily indoor endotoxin exposure for FACES participants.

Methods: Daily ambient endotoxin samples were collected at the US EPA Supersite in Fresno, CA from 5/2001-3/2009. From 2/2002-2/2003, intensive air sampling took place at 84 homes with 4-10 matched pairs of indoor and outdoor 24-hr airborne endotoxin (airEU) measurements per home. During these visits, children completed daily lung function tests and health questionnaires. All FACES subjects completed home visits during which bed and floor dust samples (dustEU) were collected for endotoxin analysis. Information on home characteristics, home activities, pets, mildew, and meteorology was collected. These data, as well as the outdoor airEU concentrations, were candidate covariates in a regression analysis.

Results: Endotoxin concentrations at the Supersite show a seasonal pattern of higher concentrations from May to October, the dry season (mean=2.8 vs 0.8 EU/m³), as did outdoor airEU at residences (dry season, mean=5.6EU/m³, wet season: mean=1.1EU/m³); however, the indoor seasonal dependency was weaker. The dustEU did not show seasonality.

Conclusions: Indoor endotoxin concentrations can be predicted using individual home characteristics. This provides a method for calculating the daily individual indoor endotoxin exposure for FACES participants.